Application No.: 10/809,737
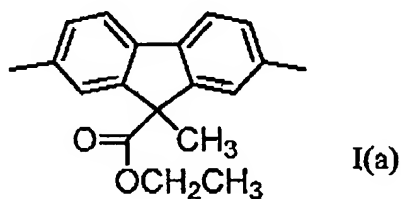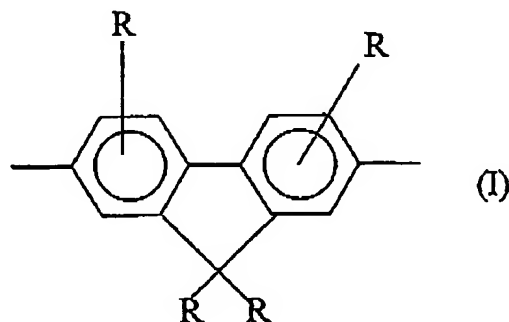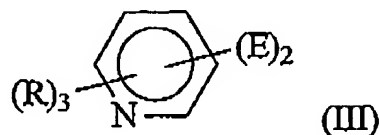Docket No.: PE0667 US DIV   Page 2

Listing of Claims

1. (Currently amended) A copolymer comprising at least one first monomeric unit and at least one second monomeric unit, wherein the at least one first monomeric unit has a Formulae I and I(a)

$$R \qquad R$$

(I)

$$R \quad R$$

$$O=C \quad CH_3$$
$$OCH_2CH_3 \qquad I(a)$$

and the at least one second monomeric unit is selected from 6-membered-ring heteroaromatic groups having Formula III

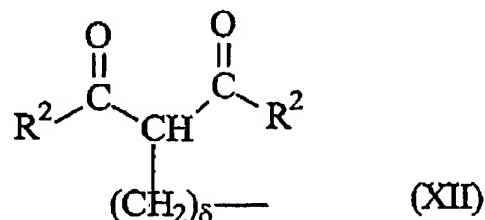$$(R)_3 - N - (E)_2 \qquad (III)$$

where:
in each of Formulae I[[, Ia,]] and III:

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R is a substituent on a carbon atom which can be the same or different at each
    occurrence and is selected from hydrogen, alkyl, aryl, heteroalkyl, heteroaryl, F, -
    CN, -OR^1, -CO$_2$R^1, -C$_\psi$F$_\lambda$, -OC$_\psi$H$_\theta$F$_\lambda$, -SR^1, -N(R^1)$_2$, -P(R^1)$_2$, -SOR^1, -
    SO$_2$R^1, -NO$_2$, and beta-dicarbonyls having Formula XII

$$R^2 \overset{\displaystyle \overset{O}{\|}}{\underset{}{C}} \underset{\underset{(CH_2)_\delta}{|}}{CH} \overset{\displaystyle \overset{O}{\|}}{\underset{}{C}} R^2 \qquad \text{(XII)}$$

or adjacent R groups together can form a 5- or 6-membered cycloalkyl, aryl, or
    heteroaryl ring,
such that:
R^1 is a substituent on a heteroatom which can be the same or different at each
    occurrence and is selected from alkyl, aryl, heteroalkyl and heteroaryl; and
ψ is an integer between 1 and 20, and θ and λ are integers satisfying Equation A1
    below:

$$\theta + \lambda = 2\psi + 1; \qquad \text{(Equation A1);}$$

in Formula III:
E can be the same or different at each occurrence and is a single bond or a linking
    group selected from arylene and heteroarylene;
in Formula XII:
R^2 is selected from hydrogen, alkyl, aryl, heteroalkyl and heteroaryl;
δ is 0 or an integer from 1 to 12[[,]] ; and with the proviso that:
when R in formula III is hydrogen, alkyl, F, -CN, -OR^1, or CO$_2$R^1 the copolymer
    further comprises end-capping groups that are aromatic.

2. (Original) The copolymer of Claim 1, wherein R groups in one or more of the at
least one first monomeric unit are independently selected from alkyl groups having 1
to 30 carbon atoms; heteroalkyl groups having 1-30 carbon atoms and one or more
heteroatoms of S, N, or O; aryl groups having from 6 to 20 carbon atoms, and
heteroaryl groups having from 2 to 20 carbon atoms and one or more heteroatoms of
S, N, or O.

3. (Original) The copolymer of Claim 1 that excludes any vinylene monomeric units.

4. (Previously Presented) The copolymer of Claim 1 wherein each R group in each of Formula I, Formula 1(a), and Formula III is selected from:

hydrogen;

alkyl;

aryl;

heteroalkyl;

heteroaryl;

F;

-CN;

-P(R^1)$_2$ and -SOR^1, where R^1 is a substituent on a heteroatom which can be the same or different at each occurrence and is selected from alkyl, aryl, heteroalkyl and heteroaryl;

-NO$_2$;

a beta-dicarbonyl having Formula XII;

-C$_\psi$H$_\theta$F$_\lambda$;

-OC$_\psi$H$_\theta$F$_\lambda$;

-OR^1, -CO$_2$R^1, -SR^1, -N(R^1)$_2$, and -SO$_2$R^1 where R^1 is a straight chain or branched alkyl of more than 20 carbons or a straight chain or branched heteroalkyl.

5. (Original) The copolymer of Claim 1 wherein the at least one of the R groups in one or more of the at least one first monomeric unit is independently selected from linear and branched n-butyl groups; linear and branched iso-butyl groups; linear and branched pentyl groups; hexyl groups, and octyl groups with and without olefinic unsaturation; phenyl groups, thiophene groups, carbazole groups, alkoxy groups, phenoxy groups and cyano groups.

6. (Original) The copolymer of Claim 1 wherein at least one of the R groups in one or more of the at least one first monomeric unit are independently selected from H, C$_6$-C$_{12}$ alkoxy, phenoxy, C$_6$-C$_{12}$ alkyl, phenyl and cyano.

7. (Previously Presented) The copolymer of Claim 1 wherein one or more of the at least one second monomeric unit is selected from Formulae III(a) through III(g),

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III(a)

III(b)

III(c)

III(d)

III(e)

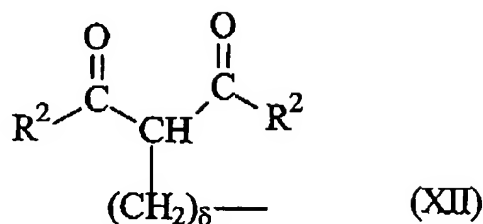III(f)

III(g)
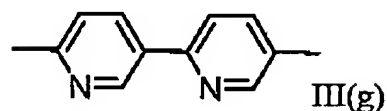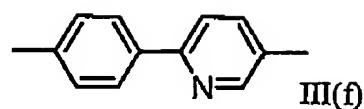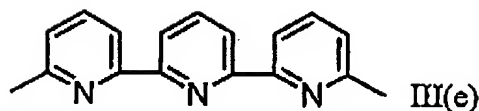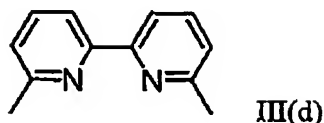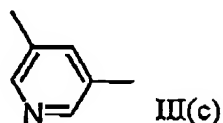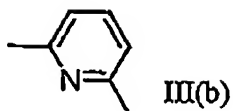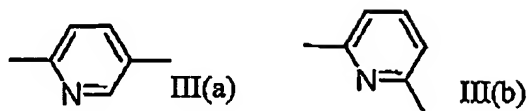
8. (Cancelled).

9. (Previously Presented) The copolymer of Claim 1, wherein one or more of the at least one second monomeric unit has Formula III wherein R is selected from:

partially or fully fluorinated alkyl groups having from 1 to 12 carbon atoms;

alkoxy groups having from 1 to 12 carbon atoms;

esters having from 3 to 15 carbon atoms;

$-SR^1$, $-N(R^1)_2$, $-P(R^1)_2$, $-SOR^1$, $-SO_2R^1$, where R^1 is an alkyl group having from 1 to 12 carbon atoms;

$-NO_2$; and

beta-dicarbonyls having Formula XII

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(XII)

where:

in Formula XII:

R^2 is an alkyl group having from 1 to 12 carbon atoms and δ is 0, 1, or 2.

10. (Original) The copolymer of Claim 1, where one or more of the at least one second monomeric unit has Formula III wherein:

R groups are selected from hydrogen, C_6-C_{12} alkyl groups, C_6-C_{20} aryl groups, and C_2-C_{20} heteroaryl groups; and

E linking groups are selected from pyridinediyl (-C_5H_4N-) and bipyridinediyl (-C_5H_4N- C_5H_4N-).

11 -13. (Cancelled).

14. (Original) An electronic device comprising at least one electroactive layer comprising the copolymer of Claim 1.

15. (Original) The device of Claim 14, wherein the device comprises a hole injection/transport layer comprising the copolymer of Claim 1.

16. (Original) The device of Claim 14, wherein the device comprises an electron injection/transport layer comprising the copolymer of Claim 1.

17. (Original) The device of Claim 14, wherein the electroactive layer comprises a light-emitting material comprising the copolymer of Claim 1.

18. (Cancelled).

19. (Original) The device of Claim 14, wherein the device is selected from a light-emitting device, a photodetector, and a photovoltaic device.

20. (Original) The device of Claim 14, wherein the device is an electroluminescent display.

21. (Currently Amended) A light-emitting device comprising at least one light-emitting layer comprising a copolymer having the following formula
at least one first monomeric unit and at least one second monomeric unit, wherein the at least one first monomeric unit has a Formulae I and I(a)

(I)

I(a)

and the at least one second monomeric unit is selected from 6-membered-ring heteroaromatic groups having Formula III
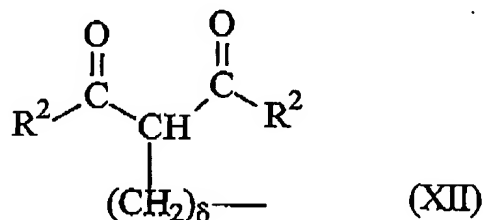

(III)
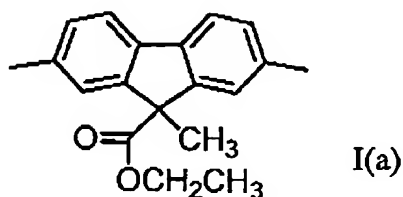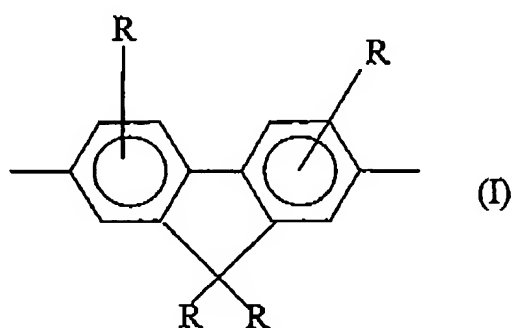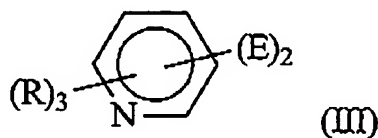
where:

in each of Formulae I[[, Ia,]] and III:

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R is a substituent on a carbon atom which can be the same or different at each occurrence and is selected from hydrogen, alkyl, aryl, heteroalkyl, heteroaryl, F, -CN, $-OR^1$, $-CO_2R^1$, $-C_\psi H_\theta F_\lambda$, $-OC_\psi H_\theta F_\lambda$, $-SR^1$, $-N(R^1)_2$, $-P(R^1)_2$, $-SOR^1$, -SO_2R^1, $-NO_2$, and beta-dicarbonyls having Formula XII

$$R^2 - \overset{\overset{\displaystyle O}{\|}}{C} \overset{}{\underset{\underset{\displaystyle (CH_2)_\delta —}{|}}{CH}} \overset{\overset{\displaystyle O}{\|}}{C} - R^2 \qquad\qquad (XII)$$

or adjacent R groups together can form a 5- or 6-membered cycloalkyl, aryl, or heteroaryl ring,

such that:

R^1 is a substituent on a heteroatom which can be the same or different at each occurrence and is selected from alkyl, aryl, heteroalkyl and heteroaryl; and

ψ is an integer between 1 and 20, and θ and λ are integers satisfying Equation A1 below:

$$\theta + \lambda = 2\psi + 1; \qquad\qquad \text{(Equation A1)};$$

in Formula III:

E can be the same or different at each occurrence and is a single bond or a linking group selected from arylene and heteroarylene [[.]] :_

in Formula XII:

R^2 is selected from hydrogen, alkyl, aryl, heteroalkyl and heteroaryl;

δ is 0 or an integer from 1 to 12.